



US EPA Region 4 and
US EPA Office of Research and Development

Present the

Environmental Research Seminar

US EPA , 61 Forsyth St., SW
Atlanta, GA
September 28-29, 2004

— Free Registration —
Information Inside

Bringing US EPA Research Results to State, Local,
Federal and Tribal Environmental Programs in the
Southeast

Seminar Overview

On September 28 - 29, 2004, scientists affiliated with EPA's Office of Research and Development (ORD), EPA Region 4, and EPA Science to Achieve Results (STAR) Grants will present their research findings at Region 4's second Environmental Research Seminar. The 2004 seminar will follow a two-day format, including an opening presentation on *Environmental Trends in the Southeast* followed by a panel discussion on *Linking Environmental Trends to EPA Research*. The seminar will feature two concurrent sessions of individual research presentations by scientists associated with EPA ORD laboratories, Region 4, and STAR Grant recipients. Attendees can choose from 19 different research presentations in addition to the opening presentation and panel discussion.

Don't miss this unique opportunity to hear from respected environmental and public health researchers and experts. Learn how their discoveries may impact environmental science and policy-making decisions in your environmental programs, projects, states and communities.

Who Should Attend

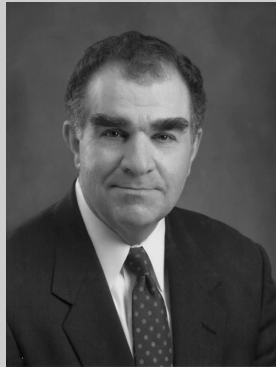
This seminar will showcase research on human and ecosystem health, environmental justice, and hazardous waste remediation within Region 4's eight Southeast states: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. Featured research presentations were specifically selected to address the needs and interests of federal, state, local, and tribal environmental and public-health professionals located throughout the southeastern states. The seminar's purpose is to educate and initiate dialog between EPA-sponsored scientists with all environmental and human-health professionals, scientists, and researchers on existing and future environmental research. Additionally, the 2004 seminar provides an opportunity for EPA Region 4-specific research to be presented in context of US EPA environmental science needs and priorities.

Welcome!

From Conference Cosponsors and Guest Speakers

Environmental science is vital to improving the quality of the environment - where we all live, work, and play. I am pleased to have this opportunity to host an important seminar sharing environmental research associated with the diverse research institutions located throughout the southeastern states of Region 4. These efforts contribute to the Nation's knowledge of its environment and, with that knowledge, we will be able to make policy and implement decisions reflecting sound science.

J. I. Palmer, Jr.
Regional Administrator
US EPA



This seminar will give you an opportunity to interact with some of the leading scientists conducting research on issues of critical importance to your region. Researchers from universities, small business, ORD's laboratories and your region will be joining together to inform you about the latest scientific results from their work in your region. We are very excited about this seminar and hope that it will help you gain insight and understanding about these interesting and innovative research projects. Please join us at this special event.



Dr. William Farland

Chief Scientist in the Office of the EPA Science Advisor
Acting Deputy Assistant Administrator for Science, ORD

Scientific research is one of the most powerful tools we have for understanding and protecting our environment. This workshop will give you an opportunity to hear and interact with some of the best environmental scientists and engineers in your region. Our STAR program is proud of the work these researchers have done. I hope you will join us in this special event to open the lines of communication between research and your region.



John C. Puzak

Acting Director
National Center for Environmental Research

Agenda at a Glance

Tuesday, September 28, 2004

Sam Nunn Atlanta Federal Center (SNAFC)
Rooms B/C/D

8:30 - 9:00	Check-in
9:00 - 9:15	Welcome & Introduction Thomas Baugh , <i>Region 4 Science Liaison to ORD</i> J. I. Palmer, Jr. , <i>Regional Administrator, Region 4</i>
9:15 - 9:30	Dr. William Farland , <i>Chief Scientist in the Office of the EPA Science Advisor, Acting Deputy Assistant Administrator for Science, ORD</i>
9:30 - 10:00	Environmental Trends in the Southeast Dr. James E. Kundell , <i>Professor and Hill Distinguished Fellow with the Carl Vinson Institute of Government, University of Georgia, Athens, GA</i>
10:00 - 11:00	Panel Discussion: <i>Linking Environmental Trends to EPA Research</i>

	<u>SNAFC Rooms B/C</u>	<u>SNAFC Room D</u>
11:10 - 12:00	Birnbaum	Lapointe
12:00 - 1:00	Lunch (on your own)	
1:00 - 1:50	Walters	Chandler
2:00 - 2:50	Gillani	Kalla
3:00 - 3:50	Tchounwou	Wilson
4:00 - 4:50	Mills	Chambers

Agenda at a Glance

Wednesday, September 29, 2004

	<u>SNAFC Rooms B/C</u>	<u>SNAFC Room D</u>
9:00 - 9:50	Whiteman	Wintenberg
10:00 - 10:50	Ludwig	Hertzberg
11:00 - 11:50	Sophianopoulos	Johnson
12:00 - 1:00	Lunch (on your own)	
1:00-1:50	Saunders	Bates
2:00-2:50	Landis	

Tuesday

10:00 - 11:00

Panel

AFC B/C Panel Discussion: Linking Environmental Trends to EPA Research

Invited Participants:

Carol Couch, *Secretary, GA Environmental Protection Division*

Jimmy Palmer, *EPA Region 4 Administrator*

William H. Farland, *Chief Scientist and Acting Deputy Assistant Administrator for Science, ORD*

Linda S. Birnbaum, *Director, Experimental Toxicology Division, NHEERL/ORD*

Paul B. Tchounwou, *Director, Environmental Science Ph.D Program, Jackson State University*

Moderator: James E. Kundell

**SNAFC Rooms B/C**

Dr. Linda S. Birnbaum, *Director,
Experimental Toxicology Division,
National Health and Environmental
Effects Research Laboratory (NHEERL)/EPA ORD*

Bromated Fire Retardants: Cause for Concern?

BFRs are used for fire prevention and consist primarily of polybrominated diphenyl ethers (PBDEs) which are commercial mixtures used largely in the electronics and furniture industries. While some of these mixtures are being phased out, individual PBDEs congeners associated with these “phased-out” mixtures are environmentally persistent and food-chain bioaccumulative. Existing research demonstrates effects to thyroid hormones and adverse effects on reproductive and neural development in rats and mice. Currently, major data gaps exist regarding fate and transport and human toxicity associated with the use of these chemicals.

**SNAFC Room D**

Dr. Brian Lapointe, *Associate Professor,
Harbor Branch Oceanographic Institute
and EPA STAR Grant Recipient*

Invasion of the Green Tides: Florida’s Coral Reefs at Risk

Drawing on his experience with nutrient pollution and coral reefs in the Florida Keys and northern Palm Beach and Broward counties, Dr. Lapointe will discuss factors initiating, sustaining, and terminating seaweed blooms in southeast Florida coral reefs. Nutrient-rich waters stimulate macroalgal (seaweed) blooms that degrade coral reef ecosystem biodiversity and growth. South Florida annually receives one-billion gallons of poorly-treated, nutrient-rich sewage pumped either offshore or into underground aquifers that seep into the ocean. This presentation is on the coastal Palm Beach County studies, where extensive green seaweed blooms occur.

12:00 - 1:00 Lunch (on your own)

Tuesday

1:00-1:50

Walters or Chandler



SNAFC Rooms B/C

Dr. David M. Walters,

*Ecological Exposure Research Division,
National Exposure Research Laboratory
(NERL)/EPA ORD*

Studies in Southeastern Aquatic Ecosystems

This presentation will overview selected ORD ecosystem studies within Region 4. Currently a study on an invasive minnow species, the red shiner, is being conducted in the Atlanta Metropolitan Area. The red shiner has negatively impacted native fishes within Region 4. ORD's research is designed to understand the genetic, behavioral, and environmental mechanisms contributing to the shiner's spread. Another study looks at polychlorinated biphenyl (PCB) contamination in a stream near Clemson, SC. This study's goal is to determine the extent and magnitude of PCB contamination, identify PCB pathways through stream food webs, and develop tools to monitor PCB mitigation efforts.



SNAFC Room D

Dr. G. Thomas Chandler, *Professor and Chairman,
Department of Environmental Health Sciences,
University of South Carolina and
EPA STAR Grant recipient*

Environmentally Mediated Endocrine Disruption in Estuarine Crustaceans

The purpose of this research is to provide insight on the adverse effects seen in wildlife and animal populations. Research results will help clarify the complexity of the eco-toxicological effects of endocrine disrupting chemicals (EDC) on several generations of crustaceans. This research is unique as it will assess EDC eco-toxicological effects from molecular to population levels in an ecologically and commercially important invertebrate group. This research will help EPA identify potential EDC effects on crustaceans in its monitoring and testing programs (e.g., toxic substances and pesticide registration). Consequently, EPA will gain the necessary insight to formulate appropriate risk assessment protocols for EDCs in aquatic ecosystems.

Tuesday

2:00-2:50

Gillani or Kalla



SNAFC Rooms B/C

Dr. Noor V. Gillani, *Principal Research Scientist,
Earth Systems Science Center,
University of Alabama and
EPA STAR Grant recipient*

Simulation of Power Plant Plume Chemistry: Uncertainty Analysis

Utility-sector power plants emit more than two-thirds of the nation's SO_2 and more than one-fourth of the NO_x : key precursors in the production of ozone, $\text{PM}_{2.5}$, and acid rain. This research is focused on: 1) identification and quantification of critical variables influencing plume chemistry, 2) diagnostic analyses of field measurements from the Southern Oxidants Study, and 3) state-of-the-art modeling, including Lagrangian Reactive Plume Modeling and pioneering large eddy simulations with detailed chemistry.



SNAFC Room D

Dr. Pete Kalla,
*EPA Region 4 - Science & Ecosystem Support Division
Athens, GA*

Southeastern Wadeable Streams Regional Environmental Monitoring and Assessment Project (REMAP)

The Southeastern Wadeable Streams REMAP applied ORD's probability sampling and analysis to Region 4's wadeable streams. The goal of this project was to determine, at $\pm 10\%$ precision with 90% accuracy, the percent of subnominal stream miles within Region 4. The term "subnominal" refers to the status of stream habitat, ecological integrity, and trophic state. This project encompassed sampling of over 200 random and 30 reference stations during a four-year period. This presentation presents the interim results for several parameters, including water-column physico-chemistry and nutrients, Rapid Bioassessment Protocol habitat score, benthic macroinvertebrate indices, and whole-body total mercury in forage fish.

Tuesday

3:00-3:50

Tchounwou or Wilson



SNAFC Rooms B/C

Dr. Paul B. Tchounwou, *Director,
Environmental Science Ph.D Program,
Jackson State University and
EPA Environmental Science Program Partner*

Health Risk Assessment and Management of Arsenic Toxicity and Carcinogenesis

Population studies of acute and chronic arsenic exposures have been done in several countries where high arsenic concentrations occur in drinking water. These studies found significantly higher mortality rates for certain cancers: bladder, kidney, liver, colon, and skin, associated with the arsenic contamination. A need exists for a comprehensive risk-assessment model to manage health risks associated with arsenic exposure. This presentation will discuss the use of the National Academy of Science's risk-assessment paradigm as a guide to develop a conceptual risk-assessment framework to evaluate and manage risk associated with arsenic exposure.



SNAFC Room D

Sabocy Wilson, *MS, Doctoral Candidate,
Department of Environmental Sciences & Engineering,
University of North Carolina and EPA STAR Grant
recipient*

Mapping of Atmospheric Ammonia Levels from Confined Animal Feeding Operations (CAFO)

The purpose of this project was to better understand human-health risks associated with exposure to ammonia emissions associated with hog CAFOs. This project used a combination of passive-diffusion air monitoring, ArcGIS, and Bayesian Maximum Entropy mapping techniques to show the distribution (space and time) of ammonia emissions near hog CAFOs. Spatiotemporal modeling can be used to assess potential ammonia exposure and health risks for populations neighboring hog CAFOs.

Tuesday

4:00-4:50

Mills or Chambers



SNAFC Rooms B/C

Dr. Marc Mills

*Land Remediation and Pollution Control
Division, National Risk Management Research
Laboratory (NRMRL)/EPA ORD*

**Developing Physical, Chemical, and Biological Tools for
Monitored Natural Recovery of PCB-Contaminated Sedi-
ments at Lake Hartwell, SC**

Contaminated sediments pose a risk to human health and the environment. The management of this risk is currently limited to three technologies: dredging, capping, and monitoring natural recovery. Monitored natural recovery relies on natural burial and removal mechanisms to mitigate the risk of the contaminant *insitu* with adequate monitoring to assure the risk is being reduced over time. This research presentation shows physical, chemical, and biological tools ORD is developing to evaluate monitored natural recovery and understand fundamental mechanisms associated with the fate of PCBs in sediments.



SNAFC Room D

Dr. Janice Chambers, *Director,*

*Center for Environmental Health Sciences,
Mississippi State University and EPA STAR Grant
recipient*

**Assessing Levels of Intermittent Exposures of Children to
Flea-Control Insecticides from Dogs**

Children may be exposed to insecticides from their pet dogs through flea-control products, e.g., flea collars. These products contain high levels of insecticides. Since children are in frequent and close contact with their dogs, the opportunity for insecticide exposure is great. This study estimated insecticide exposure to children's skin from petting their dogs and measured urinary metabolites in both children and adults exposed to dogs treated with flea-control insecticides. Study findings included a statistically insignificant increase in insecticide residues in children's urine following placement of a flea collar on a dog, but no similar increase was observed for adults.

Wednesday

9:00-9:50

Whiteman or Wintenberg



SNAFC Rooms B/C

Dr. Howard H. Whiteman, *Associate Professor,
Murray State University and
EPA STAR Grant recipient*

Developmental Stability as an Indicator of Amphibian Population Health

In this study, developmental stability (DS) was used as an indicator of stress in amphibians. DS was estimated by measuring fluctuating asymmetry in amphibian populations exposed to anthropogenic stress, as estimated by water chemistry and associated tissue contamination. This study found increasing asymmetry and tissue contamination with substantially human-impacted ponds when compared to ponds with benign water chemistry. The findings suggest that DS may be a useful tool to: understand and evaluate amphibian stressors, monitor and restore threatened populations, and assess potential threats to human health.



SNAFC Room D

Dr. Kimberly Kelly-Wintenberg, *President,
Atmospheric Glow Technologies and EPA
Small Business Innovation Research Grant recipient*

Reducing Diesel Soot Using Atmospheric Plasma

Soot is generated by diesel engines in high volumes, clogging most filters. To be effective, a filtration system must be capable of regenerating itself by oxidizing soot into carbon dioxide. Current techniques either heat the exhaust gases to 550 degrees celsius or use catalysts on the filters or in the fuel. Shortfalls of these techniques include excessive energy consumption, filter plugging, and component deterioration. AGT is developing a novel approach using a cost-effective and efficient metallic filter in combination with its patented One Atmosphere Uniform Glow Discharge Plasma (OAUGDP). This method aims to capture and oxidize sufficient diesel soot for cleaner air and still allow the engine to operate with good fuel economy.

Wednesday

10:00-10:50

Ludwig or Hertzberg



SNAFC Rooms B/C

Dr. Ralph Ludwig, *The Ground Water and Ecosystems Restoration Division, National Risk Management Research Laboratory (NRMRL)/EPA ORD*

Evaluating the Effectiveness of a Compost/Zero-valent Iron-Based Permeable Reactive Barrier Clean Up: Columbia Nitrogen Site, Charleston, SC

One of Region 4's Regional Applied Research Efforts (RARE) projects resulted in two different studies on cleaning up the Columbia Nitrogen Superfund Site located in Charleston, SC. This site is extensively contaminated with pyrite and elemental sulfur used in phosphate fertilizer production, which resulted in arsenic and heavy metal ground-water contamination. This study examined the effectiveness of using a combination of municipal compost and zero-valent iron PRB to treat arsenic and heavy metals using microbially-mediated sulfate reduction. Preliminary results indicate that PRB is effectively treating ground water with minimal maintenance.



SNAFC Room D

Dr. Richard C. Hertzberg, *National Center for Environmental Assessment (NCEA)/EPA ORD*

**Homeland Security Related Cumulative Risk:
Determining Building Re-entry after Chemical Contamination**

Buildings contaminated by highly toxic chemicals associated with terrorist activities require extensive decontamination and the eventual decision whether and when the building can be returned to normal use. Key steps in cumulative risk assessment, e.g., stakeholder involvement and close links between the assessment and possible risk management actions, are highly relevant to re-entry decisions. Using short-term-exposure advisory levels as an example, this presentation explores some of the uncertainties and alternative assessment methods under consideration for assisting building re-entry decisions.

**SNAFC Rooms B/C****Dr. Judy Sophianopoulos,***EPA Region 4 Science and Ecosystem Support Division,
Athens, GA***Iron and an Arsenic-Eating Fern Work Together to Clean Up a Superfund Site: Columbia Nitrogen Site, Charleston, SC**

One of Region 4's Regional Applied Research Efforts (RARE) projects resulted in two different studies on cleaning up the Columbia Nitrogen Superfund Site located in Charleston, SC. This site is extensively contaminated with pyrite and elemental sulfur used in phosphate fertilizer production, which resulted in arsenic and heavy metal ground-water contamination. This study examined the effectiveness of using Chinese Brake Ferns to phytoremediate arsenic. Preliminary results indicate the fern removes both arsenic and lead from contaminated soil. Because this fern is a perennial in Charleston climate, it can be effectively used most of the year.

**SNAFC Room D****Bonita Johnson, EPA Region 4***Science and Ecosystem Support Division,
Athens, GA, and Regional Research
Partnership Program Scientist***Using DNA to Identify Sources of Pathogen Contamination**

Microbial Source Tracking (MST) using DNA is an approach to identify sources of pathogen contamination in water. MST has been used to identify sources of waterborne disease; and can be used to develop Total Maximum Daily Loads (TMDLs) and design Best Management Practices to reduce pathogen contamination. In this study, Polymerase Chain Reaction/Agarose Gel Electrophoresis is used to identify species of *Enterococci* bacteria isolated from cattle manure and streams in Georgia's Broad River watershed. This river is an impaired water body, impacted by human and animal fecal contamination attributed primarily to septic tank systems and agricultural runoff.

12:00 - 1:00 Lunch (on your own)

Wednesday

1:00-1:50

Saunders or Bates



SNAFC Rooms B/C

Dr. F. Michael Saunders, *Professor,
Georgia Institute of Technology and
EPA STAR Grant recipient*

Mercury Transformations and Fate in Marine Sediment Systems

Mercury is a natural constituent in soils and, through soil erosion and transport, becomes a natural constituent of fresh-water and marine sediments. In marine sediments, methylated mercury has both high solubility and mobility and is the dominant mercury form found in fish and aquatic life, causing major human-health concerns. This presentation discusses the role of bacterial-community structure within sediments, natural organic matter, tidal cycles, salt-marsh grass (*Spartina*) populations and their growth cycles, and mercury sources. Additionally, approaches to effectively control harmful methyl-mercury releases from marine sediments into marine waters will be included in this presentation.



SNAFC Room D

Edward R. Bates, *Land Remediation and Pollution
Control Division, National Risk Management
Research laboratory (NRMRL)/EPA ORD*

Characterization/Remediation for Wood Preserving Sites

EPA has identified over 600 wood-preserving sites within the U.S.; most are abandoned. Generally, these sites are contaminated with creosote, pentachlorophenol, and chromated copper arsenate, or a mixture of these chemicals. Often these sites will have three ground-water plumes, i.e., 1) dissolved, 2) light, and 3) dense non-aqueous phase liquid plumes, and each plume may be moving in a different direction. This presentation highlights site-characterization approaches for locating these plumes and contaminated soils. Additionally, this presentation will discuss the formulation of applicable, cost-effective remedial designs using a combination of treatment and containment technologies.

Wednesday

2:00-2:50

Landis



SNAFC Rooms B/C

Dr. Matthew S. Landis, *Human Exposure and Atmospheric Sciences Division, National Exposure Research Laboratory (NERL)/EPA ORD*

Mercury Species Measured off the Atlantic Coast of South Florida

This Regional Applied Research Effort (RARE) project measured several chemical species of mercury in the atmosphere from 200 to 12,000 feet above the Atlantic Coast of South Florida. EPA partnered with National Oceanic and Atmospheric Administration (NOAA) scientists and their specially equipped airplane for two sampling campaigns in the winter and summer of 2000. New techniques were used to sample mercury, trace elements, and other chemical species, such as ozone in the well-mixed boundary layer and higher in the free troposphere. The data made important contributions to our understanding of long-range atmospheric transport of mercury and provides new insights on atmospheric mercury.

Seminar Specifics

For more information on this seminar contact
Beth Walls at 404-562-8309 or
Estella Waldman at 202-343-9803

Date: September 28-29, 2004

Time: 8:30 a.m. - 5:00 p.m.

Location: US EPA Region 4
Sam Nunn Atlanta Federal Center
61 Forsyth Street, S.W.
Atlanta, GA 30303-8960

For more information and directions to the
US EPA Region 4 Office in Atlanta, please visit:
www.epa.gov/region4/visitors/transport1.htm

Seminar Notes

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FREE! Attendee Registration for US EPA's Environmental Research Seminar

All information must be filled out completely. One name per form. Please make additional copies as needed. Registration is necessary as seating is limited. Do not duplicate this form by mail if you have already registered online or by fax. For more information on this seminar contact Beth Walls at 404-562-8309 or Estella Waldman 202-343-9803

* Please register no later than **September 15, 2004**

FAX

1-404-562-8269

On-Line Registration

www.epa.gov/region4/ers/index.htm

MAIL

Attn: Betty Winter

US EPA Region 4

61 Forsyth Street, S.W.

Atlanta, Georgia 30303-8960

Name _____ Title _____

Organization _____

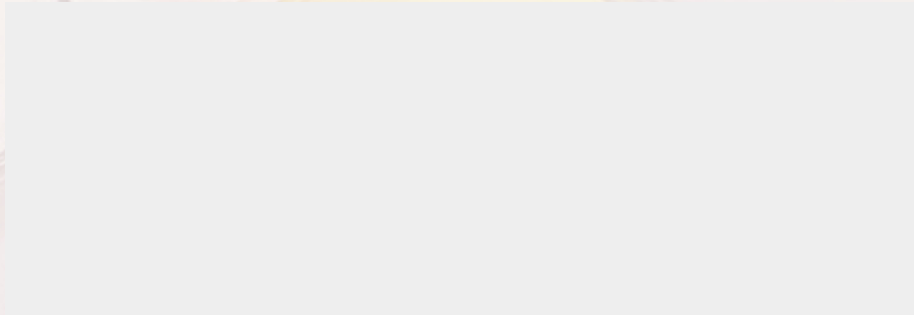
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September 28-29, 2004 • 8:30 a.m. - 5:00 p.m.

US EPA Region 4 Office (Sam Nunn Atlanta Federal Center)

For more information and directions to US EPA's regional office in Atlanta, please visit: www.epa.gov/region4/visitors/atlanta1.htm